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PRINCIPAL INVESTIGATOR: James C. Coyne, Ph.D.

CONTRACTING ORGANIZATION: The University of Pennsylvania
Philadelphia, Pennsylvania 19104-6205

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6. AUTHOR(S)
James C. Coyne, Ph.D.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
The University of Pennsylvania
Philadelphia, Pennsylvania 19104-6205

E-Mail: jcoyne@mail.med.upenn.edu

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Androgen deprivation therapy (ADT) is increasingly prescribed to patients with prostate cancer and brings with it an array of adverse effects. Hot flashes are a common side effect of ADT and are believed to be qualitatively similar to hot flashes among women receiving treatment for breast cancer. Currently no assessment protocols exist for objective assessments of hot flashes in prostate cancer patients, making it difficult to evaluate outcomes in clinical trials, educate clinicians and patients, or develop management and treatment strategies. This project will provide basic clinical epidemiological data concerning the nature, prevalence, and correlates of hot flashes among prostate patients receiving ADT, document the negative effects of hot flashes on sleep, fatigue, and quality of life, and compare the accuracy of alternative means of assessing hot flashes. The overarching goal is to not only understand the nature and importance of hot flashes, but to develop methodological standards for the assessment of hot flashes suitable to diverse applications. Results will have implications for the education of oncologists with respect to quality of life issues in prostate cancer, set standards for future research and clinical endeavors, and suggest directions for patient-oriented research to improve the wellbeing of prostate cancer patients.

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Introduction

Prostate cancer patients are often treated with androgen deprivation therapy (ADT) through chemical or surgical castration, a procedure resulting in the ablation of testosterone, an androgenergic hormone which is linked to increased proliferation of prostatic tumors. Hot flashes are a common side-effect of ADT, affecting up to 80% of prostate cancer patients treated with ADT. Although not medically threatening, hot flashes have been associated with sleep disruption, physical discomfort, and significant dimunation in quality of life. However, hot flashes are not a directly observable phenomena and researchers must usually rely on self-reports of hot flashes, making it difficult to obtain accurate estimates of their frequency and intensity, particularly when hot flashes are nocturnal. Thus, hot flashes and their correlates are not well understood, and the most reliable and valid means of assessment remain unclear.

The current project examines hot flashes among prostate patients receiving ADT through the use of multi-method assessment combining self-report data with objective assessment of sternal conductence and actigraphy. This investigation will provide descriptive information on the nature, prevalence, and correlates of hot flashes; describe relationships of objectively assessed hot flashes to sleep patterns, fatigue, and quality of life; and compare assessment modalities in their ability to represent the occurrence of hot flashes. Approximately 150 patients will participate in a one-week assessment period at baseline and at six-month follow up. Assessment procedures include baseline self-report instruments designed to assess demographic variables, retrospecive reports of the frequency and intensity of hot flashes, fatigue, activity level, quality of life, nocturia, psychological distress, and coping. In addition, during each seven-day assessment period, participants will complete daily symptom diaries designed to assess the frequency, intensity, and duration of hot flashes, and the life and role interference associated with hot flashes. During this seven-day period, participants will be fitted with a small, wristwatch-sized accelerametor designed to record activiy-levels during wakefulness and sleep. During two 24-hour periods at the beginning and end of each seven-day assessment period, participants will wear a sternal skin conductance monitor designed to objectively assess the occurance of hot flashes. These sources of data (self-report, actigraphy, and sternal skin conductance) will be combined to allow for a clearer picture of the frequency, intensity, and duration of hot flashes, and, ultimately, will allow for a better assessment of how these influence quality of life and functional status.

Body

This project received full human subjects approval by the Department of Defense Grants Officer on March 12, 2003. Since that time, a Postdoctoral Research Fellow has served as the position of project manager. Janet Carpenter, Ph.D., RN, a grant consultant, who is an expert in the assessment of hot flashes in cancer patients provided two training sessions to study staff on the subjective assessment of hot flashes, the use of sternal conductance monitoring and associated software, and on associated data analyses. Three research assistants were hired in early to recruit subjects and collect data during home visits. Recruitment of patients began in May 2004, and the first baseline assessment occurred in June, 2004. A total of 37 eligible patients have been approached by study staff for recruitment; four have declined to participate,17 have completed the baseline assessment, and two participants are currently being run. To guarantee adequate accrual we have received in-house IRB approval to extend recruitment to associated satellite clinics.

In line with our study's goal of testing the feasibility of sternal skin conductance in men, early assessments revealed some distinct limitations with this mode of hot flash measurement. It should be noted that the view of sternal skin conductance as the "gold standard" for objective assessment of hot flashes has been based entirely on studies of menopausal women and women with breast cancer, and ours is the first study to extend this approach to men.

The equipment used in sternal conductance has demonstrated some short comings when worn by patients in their everyday environments, and we have been working with the supplier, Biolog corporation, to overcome these difficulties. As well, the presence of chest hair has proven to be an obstacle to ease of use. Removal of chest hair is not an option, as this also removes skin which, in turn, negatively impacts skin conductance. To overcome this, we have conducted literature reviews to find other comparable locations to measure skin conductance that would meet the requirements of sweat gland density and low psycho-activity of sweat glands, and are piloting these alternative sites. As well, we have found that measurement artifacts are common. In response, we are now downloading the Biolog data at the patient home visit in order to query participants about any unusual outcomes. We have identified that placing pressure on the electrode, which participants are likely to do in response to itchiness, as well as exercise and cell phone use creates artifact. We have also created surveys to obtain the reasons why participants refuse to wear the Biolog monitor as well as a survey on the experience of wearing a monitor. Overall, we have taken an active, problem-solving approach to tackling problems that are inherent in the assessment of sternal conductance in active, ambulatory persons, but also that are specific to men.

In terms of sociodemographic information, the sample thus far is a primarily older (M = 71.83 yrs, R = 53 to 85yrs), married (72%) and Caucasian (83%), although the remaining 17% self-identify as African-American. All participants had at least a high school education and one-third had completed graduate or professional school. One-third of the sample was working full-time, although most (56%) were retired. All participants had health insurance and 55% received annual income over $60,000.

Our contention that subjective reports of hot flashes are inadequate to understand the phenomena has been supported by the current data. We found that the mean number of subjectively reported hot flashes during the day relative to evening is approximately twice the size of the same difference for objectively assessed hot flashes. (See Table 1) Thus, although there is little variability in objective hot flashes over the course of the day, self reports vary widely, and individuals are much more likely to report hot flashes during daytime hours. This difference may be due to individuals sleeping through some hot flashes in the evening and hence, not event marking the occurrence.

Table 1: Hourly Mean of Hot Flash Occurrences

	Hourly M (SD)	Range
Daytime Self-Reports of Hot Flashes	.72 (.56)	.24-1.24
Daytime Objective Hot Flashes	.94 (.57)	.29-1.41
Nighttime Self-Reports of Hot Flashes	.50 (.52)	0-1.29
Nighttime Objective Hot Flashes	.82 (.53)	.14-1.43

We also assessed participants' accuracy in identifying hot flashes by comparing self-reports of hot flashes to objectively assessed hot flashes. Results suggest that participants vary widely in this ability, as seen in Table 2.

Table 2: Validity of Self-Reported Hot Flashes Compared to Objective Hot Flashes

	M (SD)	R
Sensitivity	.38 (.24)	.17-.65
Specificity	.73 (.27)	.45-1.00
PPV	.57 (.32)	.25-1.00
NPV	.62 (.23)	.36-.89

Sensitivity, the probability that an objectively assessed hot flash would be identified in self-report, ranged from .17 to .65, and, on average, participants were only able to correctly identify 38% of the hot flashes that occurred. As well, positive predictive value, the probability of an objectively assessed hot flash given a self-report of a hot flash, was only moderate. Participants were somewhat more accurate in self-reporting the absence of hot flashes when, in fact, objective indices show no hot flash activity (i.e., specificity). In this case, 73% of the objectively assessed periods in which no hot flashes occurred were accurately identified in self-report. Negative predictive value, the probability that a self-report of no hot flash activity would be reflected in a negative objective assessment of hot flash activity was also moderate. On average, 62% of these negative self-reports were accurate. These preliminary data suggest that individuals vary greatly in their ability to accurately identify hot flashes, supporting our aim of developing more accurate objective indices of this phenomenon.

Key Research Accomplishments

- Research staff have been hired and trained.
- Initial referral sources have been expanded, active recruitment of patients continues.
- Databases have been created and preliminary analyses are ongoing as data are entered and cleaned.

Reportable Outcomes

At this point, no manuscripts, abstracts, presentations; patents and licenses; development of cell lines, tissue or serum repositories; infomatics; funding; employment or research opportunities have been applied for or obtained based on experience with or outcomes of this study.

Conclusions

Since receiving final approval in Year 2, we have finalized procedures, hired and trained staff, and are currently actively enrolling patients. A no-cost extension request has been submitted in order to meet our accrual goals and fulfill our obligations.

References

None

Appendices

None